

*BikeWest
reply to the
2019
Wyndham
Pedestrian
& Cycle
Strategy*

A response to the
proposed strategy

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About the Author

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Executive Summary

BikeWest's motivation to advocate for high quality cycling infrastructure is because we know this creates a better future for us and our children and society as a whole. We see quieter, calmer communities where young people are able to move about safely on their bicycles with increased amenity, reduced pollution and better quality of life. These sorts of investments help our children be healthy and active. Australia has now reached the staggering statistic that 1 in 3 young people do not know how to ride a bicycle¹. Through the systemic approach of trying to protect our children, we have removed our children from the danger rather than the far more reasonable approach of removing the danger.

The analytical framework used by BikeWest draws upon the latest evidence and the theme of the *Safe System* which involves separating incompatible masses and speeds. This approach is taken to ensure any collisions are tolerable for humans with the acceptance that people make mistakes and that people should not have to pay for such mistakes with their lives or serious injury. This approach is diametrically opposed to the *Vehicular Cycling* approach that road authorities and councils in Australia implicitly adopt where safety is wholly the responsibility of the individual.

In addition to the *Safe System* approach, the analysis draws upon the work of Pucher and Buehler in their seminal paper, *Making Cycling Irresistible*. This paper includes 7 key policies and measures: extensive system of separate cycling facilities, intersection modification and priority traffic signals, traffic calming, bike parking, coordination with public transport, traffic education and training and changes to traffic laws.

The analysis is further informed by community considerations, especially concerning parking, what type of bicycle infrastructure is acceptable to different types of people and the notion of opportunity cost of infrastructure options and the benefit cost ratios of such investments.

BikeWest is broadly supportive of the Wyndham Pedestrian and Cycle Strategy, however, we are concerned about the details of certain Action Numbers.

An audit of pedestrian and cycle networks to identify missing links is a vital starting point. However, it is not only the amount of infrastructure but the quality of the infrastructure that is important. More painted lines on roads will not get more people leaving their cars at home and jumping on their bicycles. This is related to the density of the network. This is a prerequisite to develop comprehensive and coherent networks. This is a must. Without proper planning the development of cycle infrastructure will be ad hoc and result in a poor outcome with no coherence.

The proposed use of the Movement and Place Framework to assess activity intensive areas is problematic. While elements of the Movement and Place Framework are useful, the language used indicates a lack of understanding of the needs of cycling infrastructure. According to the Safe System Approach, cycling infrastructure should attempt to minimise the interactions between different modes, not simply improve them. The Movement and Place Framework also discusses Level of Stress as a form of assessment of cycling infrastructure. This is an antiquated approach. According to Austroads Research Report: Best Practice in Road Safety Infrastructure Programs², where speeds of motor vehicles are above 30km/h cyclists must **always** be separated from motor vehicle traffic (p5) due to the incompatibility of speeds and masses.

¹ Crawford, S., Bennetts, S. K., Cooklin, A. R., Hackworth, N., Nicholson, J. M., D'Esposito, F., Green, J., Matthews, J., Zubrick, S. R., Strazdins, L. & Parcel, G. 2015. Parental fear as a barrier to children's independent mobility and resultant physical activity. Final Report. Melbourne: La Trobe University

² Austroads 2018 Best Practice in Road Safety Infrastructure Programs Research Report AP-R562-18

BikeWest supports the preparation of an implementation plan in order to methodically plan improvements. This must include works that are not specifically identified as cycling infrastructure such as Local Area Traffic Management Plans and road re-sheeting.

Review of all internal documents should be encouraged, however, the current standards suggested by VicRoads are inconsistent with world's best practice or even Queensland's Department of Main Roads³, including the latest Austroads publication regarding Best Practice in Road Safety Infrastructure Programs⁴. Unfortunately this has led councils in Victoria to install substandard infrastructure as they follow VicRoads guidelines. Every effort should be made to utilise the most up to date guidance including that provided by the National Association of City Transport Officials (NACTO) in the USA. NACTO provide extensive documents on the most up to date practices.

BikeWest is also supportive of innovative approaches are required to incorporate cycling infrastructure into the City of Wyndham. Traditional approaches to road design in Australia often limit the ability to install high quality infrastructure due to the conservative approach undertaken by most traffic engineers who prioritises high speed vehicular flow. It is vital that professionals from other disciplines are involved as well as extensive community engagement along the lines adopted by Complete Streets with their Place Score Approach. This innovative approach often highlights the discrepancy between what council perceives as priorities for its residents to what residents actually desire. An excellent case study is the City of Coffs Harbour⁵.

The amenity of cycling infrastructure ranges from attractive to intimidating and can encourage or discourage cycling along a route. Landscaping and surroundings can make a cycling route very attractive through an area that might have otherwise been avoided, while high fences, lack of casual surveillance and no lighting at night can result in actual and perceived loss of personal security.

Education is key as identified by Pucher and Buehler and included in the City of Sydney Cycle Strategy. At a minimum every child in the Wyndham LGA should undertake bicycle riding lessons as currently 1 in 3 young people in Australia do not know how to ride a bicycle⁶. The Wyndham Pedestrian and Cycle Strategy should include elements to actively support people new to cycling and those who are wary of getting back on their bikes. Data published by Active Healthy Kids Australia (Figure 9) shows the significant decline in the percentage of children who use active transport to and/ or from school since 1970 across a number of countries.

The importance of getting children to cycle to school cannot be overstated. The Australian Health Policy Collaboration produced a report in 2018 titled Active Travel: Pathways to a Health Future. This report established

- over 70% of children and 91.5% of young people do not meet physical activity recommendations⁷.
- Declining rates of physical activity are contributing to accelerating rates of childhood overweight and obesity. Over one-quarter of Australian children are overweight or obese⁸.

³ Queensland Department of Main Roads 2015 Technical Note 128 Selection and Design of Cycle Tracks, May

⁴ Austroads 2018 Best Practice in Road Safety Infrastructure Programs Research Report AP-R562-18

⁵ <https://www.coffsharbour.nsw.gov.au/Building-and-Planning/Place-Strategies/Pages/PlaceScore.aspx>

⁶ Crawford, S., Bennetts, S. K., Cooklin, A. R., Hackworth, N., Nicholson, J. M., D'Esposito, F., Green, J., Matthews, J., Zubrick, S. R., Strazdins, L. & Parcel, G. 2015. Parental fear as a barrier to children's independent mobility and resultant physical activity. Final Report. Melbourne: La Trobe University

⁷ Lindberg, R., et al., Getting Australia's Health on Track 2016. 2016, Australian Health Policy Collaboration, Victoria University: Melbourne

⁸ Tolhurst, P., et al., Australia's Health Tracker. 2016, The Australian Health Policy Collaboration, Victoria University: Melbourne

- 9.7% of school children have been measured as vulnerable in their physical health and wellbeing domain in the Australian Early development Census, a three yearly survey of children entering their first year of school⁹.
- Regular physical activity is recognised as improving academic performance¹⁰¹¹.

A more comprehensive approach to a bicycle strategy compared to the Wyndham Pedestrian and Cycle Strategy are the recent strategies published by the City of Sydney and the City of Melbourne. These strategies adopt *Safe System* principles as well as include many more of Pucher and Buehler's policies and measure with a strong evidence base.

⁹ Australian Early Development Census. Emerging Trends. 2014; Available from: <https://www.aedc.gov.au/early-childhood/findings-from-the-aedc>

¹⁰ Howie, E.K. and Pate, R.R., Physical activity and academic achievement in children: A historical perspective. *Journal of Sport and Health Science*, 2012. 1(3): p. 160-169

¹¹ Duncan, M., & Johnson, A. (2014). The effect of differing intensities of acute cycling on preadolescent academic achievement. *European journal of sport science*, 14(3), 279-286.

Introduction

This submission is a response to *Draft Wyndham Pedestrian and Cycle Strategy*. BikeWest's strategic goals include, but are not limited to, increasing the number of people cycling; promoting the associated health, environmental and amenity benefits through such activity, and the value for money bicycle infrastructure investments create. BikeWest's assessment of these sections is informed by an analytical framework based on a substantial international evidence base.

Motivation

BikeWest advocates for high quality cycling infrastructure. We do so because we know this creates a better future for us and our children and society as a whole. We see quieter, calmer communities where young people are able to move about safely on their bicycles with increased amenity, reduced pollution and better quality of life. Future potential heaven or hell scenarios are vividly described in a new publication by New London Architects (Appendix 1: Heaven and Hell Scenarios).

We want our children to be healthy and active but as a result of our cities becoming more and more car focused, that choice is increasingly being taken away from us all. Australia has now reached the staggering statistic that 1 in 3 young people do not know how to ride a bicycle¹². Through the systemic approach of trying to protect our children, we have removed our children from the danger rather than the far more reasonable approach actually removing the danger.

Analytical Framework

Our response to the *Wyndham Pedestrian and Cycle Strategy* was developed in accordance to an analytical framework based upon the latest academic literature, road safety best practice and local as well as international case studies. It is also influenced by the type of communities that BikeWest considers are desirable in light of our society's decreasing physical activity and the inescapable health problems that result directly from that.

Safe System

The philosophical underpinnings for this analysis is that no one deserves to die or be seriously injured simply getting from A to B. This is the starting point for the Safe System approach originated in Sweden in the 1990s which is now VicRoads policy. The Safe System approach acknowledges that, as people, we all make mistakes or get distracted but these mistakes or distractions need not cost us our life, our health or someone else's life or health. Human bodies are fragile, there's only so much physical force we can withstand. This is why we need to do all we can to keep ourselves, and others, safe on our roads.

When people travel on foot or on bicycles they have essentially zero protection. A person travelling in a car is essentially travelling in a 2 tonne metal box. The kinetic energy of a 70kg person, on a 15kg bike travelling at 15km/h is 740 joules; a person travelling in a 2 tonne box at 50 km/h is 193000 joules, over 260 times more. This is a potentially deadly discrepancy.

People on foot or on bicycle are vulnerable. The person in the protected 2 tonne metal box is not. The engine in the metal box also means the metal box travels an order of magnitude faster than people on foot or on bicycles. The laws of physics, specifically conservation of momentum and collisions, means that if a person in a 2 tonne metal box collides with a person on foot or on a bicycle, it is **ALWAYS** the person on foot or on the bicycle that will be killed or seriously injured.

¹² Crawford, S., Bennetts, S. K., Cooklin, A. R., Hackworth, N., Nicholson, J. M., D'Esposito, F., Green, J., Matthews, J., Zubrick, S. R., Strazdins, L. & Parcel, G. 2015. Parental fear as a barrier to children's independent mobility and resultant physical activity. Final Report. Melbourne: La Trobe University
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The starting point of keeping everyone alive and uninjured, the Safe System approach, means that objects of different speed and mass are required to be physically separated. It is uncontroversial when it comes to separating people travelling by foot and people travelling in cars by separated footpaths, provided on nearly every street in Australia. As stated above, people traveling on bicycles are just as vulnerable as those travelling by foot. Given that same level of vulnerability, it is reasonable to conclude that if a facility is unsafe to walk, logically it is unsafe to cycle. This is summed up by the following dramatic image in Figure 1.



Figure 1: If it's not OK to walk, it's not OK to cycle

Clearly the situation in Figure 1 would be completely unacceptable and if a mother with a small child attempted such a thing they would in all likelihood be arrested for endangering the life of their child. Though people travelling on bicycles are routinely expected to accept the level of risk associated with this type of facility, indeed often forced to do so by the road environment.

Despite this seemingly logical conclusion, councils and state roads bodies continue to install dangerous cycling facilities such as the one Figure 1 which is found in Perth . One conclusion from this may be that councils and roads bodies have research to suggest that these facilities are in fact safe, though perhaps not be perceived to be safe. On review of the latest peer reviewed research, it would appear that councils and roads bodies are sticking to the outdated ideas with no evidence to support such policies and designs. From the type of infrastructure that is still routinely installed in Wyndham and wider Melbourne, it seems that the council and VicRoads still adhere to the universally discredited "Vehicular Cycling Theory".

Vehicular Cycling Theory

Vehicular cycling (also known as bicycle driving) is the practice of riding bicycles on roads in a manner that is in accordance with the principles for driving in traffic, and in a way that places responsibility for safety on the individual.

The phrase "*vehicular cycling*" was introduced by John Forester in the 1970s in his book *Effective Cycling*. Forester contends that "Cyclists fare best when they act and are treated as drivers of vehicles". This philosophy includes small children in heavy and fast moving traffic.

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Vehicular cycling has been described as a naive, polarising "ideology" that "essentially advocates bicyclists should strive to behave like cars on the streets despite the obvious risks to life.

Distracted Driving

The rise of mobile phone use while driving has directly lead to instances distracted driving. A staggering rise in the chance that if a motorist is drifting into a shoulder or bike lane, it is because they aren't paying attention and distracted by a mobile phone. Queensland has recently introduced \$1000 fines in their efforts to combat this killer behaviour. A 24 year old Victorian woman is currently serving a prison sentence after killing a cyclist while distracted by her phone.

Accordingly, if a cyclist attempts to ride where a motorist is drifting in order to 'reclaim their right of way', it is likely that they won't be seen. Citing the rise in US crash fatalities, David Dudley at CityLab wrote, "the swift erosion of America's driving abilities is yet another reason to admit that the cause of "vehicular cycling"—the safe-biking philosophy that says bikes should ride assertively rather than cower at the side of the road—is increasingly compromised by reality".

Anger between Vehicular Cyclists and Drivers

The sharing of road lanes through vehicular cycling was supposed to cause an *increased level of mutual understanding between motorists and cyclists*. In the US, Tom Babin from Citylab observed "What happened instead was some hearty bicycle lovers adopted the tenets of vehicular cycling in the way they got around cities... They asserted their rights to the road, and made those cross-traffic left-hand turns that make less confident cyclists gasp in horror. All of which pissed off those drivers who thought they owned the road." A similar phenomenon has occurred in Australia. Vehicular cycling has failed to bring about its intended result. Yet, the part of the theory that encourages bikes to be forceful lives on through the actions of its advocates and roads bodies through the types of infrastructure they install.

Crucially, there are no examples of peer reviewed literature that suggests the adoption of Vehicular Cycling Theory has led to an increase in the number of people making journeys on bicycles or made cycling safety. Conversely there are countless examples where such practices have dramatically reduced the amount of cycling and led to increases of deaths and serious injuries. In fact, for the last 2 years, the most bicycle friendly country in the world, the Netherlands, has been named the best place to drive a car in the Driver Satisfaction Index¹³. This may seem counter-intuitive, but a key ingredient in creating the world's most enjoyable driving conditions is providing the freedom to leave the car at home. With the ability to walk or cycle for short trips, tram or bus for longer trips, and use a fast, frequent public transport, the car is viewed as a last resort for many Dutch families. With fewer motorists moving both short and long distances on the country's roads, space is freed up for those who really need it, such freight and emergency services. In addition to reducing the amount of congestion, this also decreases the need for road maintenance due to "wear and tear." The report mentions the unparalleled safety of Dutch streets, which are statistically the safest in the world.

Evidence Base

The seminal research article with respect to increasing the amount of cycling in a community is "Making Cycling Irresistible: Lessons from The Netherlands, Denmark and Germany", published in 2008 by John Pucher and Ralph Buehler¹⁴. This article clearly lays out the necessary actions needed to increase the amount of cycling by significant amounts.

¹³ https://dailyhive.com/vancouver/best-place-in-the-world-to-be-a-driver-netherlands?fbclid=IwAR0tciEAb-XTb6_vpDTk8E2gSOUtEoFmjy_-YuoKj2cOOPo9f56-iSBzE14

¹⁴ Pucher, J., & Buehler, R. (2008). Making cycling irresistible: lessons from the Netherlands, Denmark and Germany. *Transport reviews*, 28(4), 495-528.

There are the 7 policies and measures are described below.

1. **Extensive systems of separate cycling facilities**
 - Well-maintained, fully integrated paths, lanes and special bicycle streets in cities and surrounding regions
 - Fully coordinated system of colour-coded directional signs for bicyclists
 - Off-street short-cuts, such as mid-block connections and passages through dead-ends for cars
2. **Intersection modifications and priority traffic signals**
 - Advance green lights for cyclists at most intersections
 - Advanced cyclist waiting positions (ahead of cars) fed by special bike lanes facilitate safer and quicker crossings and turns
 - Cyclist short-cuts to make right-hand turns before intersections and exemption from red traffic signals at T-intersections, thus increasing cyclist speed and safety (translated into Australian, this would be a left hand turn, no crossing of traffic)
 - Bike paths turn into brightly coloured bike lanes when crossing intersections
 - Traffic signals are synchronised at cyclist speeds assuring consecutive green lights for cyclists (green wave)
 - Bollards with flashing lights along bike routes signal cyclists the right speed to reach the next intersection at a green light
3. **Traffic calming**
 - Traffic calming of all residential neighbourhoods via speed limit (30 km/hr) and physical infrastructure deterrents for cars
 - Bicycle streets, narrow roads where bikes have absolute priority over cars
 - 'Home Zones' with 7 km/hr speed limit, where cars must yield to pedestrians and cyclists using the road
4. **Bike parking**
 - Large supply of good bike parking throughout the city
 - Improved lighting and security of bike parking facilities often featuring guards, video-surveillance and priority parking for women
5. **Coordination with public transport**
 - Extensive bike parking at all metro, suburban and regional train stations
 - 'Call a Bike' programmes: bikes can be rented by cell phone at transit stops, paid for by the minute and left at any busy intersection in the city
 - Bike rentals at most train stations
 - Deluxe bike parking garages at some train stations, with video-surveillance, special lighting, music, repair services and bike rentals
6. **Traffic education and training**
 - Comprehensive cycling training courses for virtually all school children with test by traffic police
 - Special cycling training test tracks for children
 - Stringent training of motorists to respect pedestrians and cyclists and avoid hitting them
7. **Traffic laws**
 - Special legal protection for children and elderly cyclists
 - Motorists assumed by law to be responsible for almost all crashes with cyclists
 - Strict enforcement of cyclist rights by police and courts

Some critics suggest that Pucher and Buehler's work is not suitable to Anglophone countries such as Australia and the US where different cultural factors make it irrelevant.

Fortunately research on cycling related matters has continued in Australia and the US since their work was published and unsurprisingly the results of these studies confirm the findings of Pucher and Buehler.

Three recent studies in particular are worth drawing attention to. The first is by Dr Ben Beck from Monash University, published in April 2019 in *Accident Injury and Prevention*¹⁵ that shows marked on-road bicycle lanes and parked cars reduced the distance that motorists provide when passing cyclists. The results demonstrate that a single stripe of white paint does not provide a safe space for people who ride bikes as nearly all potential bicycle riders know instinctively.

When the cyclist and driver share a lane, the driver is required to perform an overtaking manoeuvre. This is in contrast to roads with a marked bicycle lane, where the driver is not required to overtake. This leads to a false security of providing adequate passing distance, believing it to be catered for. Such behaviour is amplified in an age of increased distracted driving. Beck concludes the focus of on-road cycling infrastructure needs to be on providing infrastructure that separates cyclists from motor vehicles by a physical barrier.

One of the consequences of *Vehicular Cycling* is increased anger from drivers towards cyclists. A study by Oldmeadow et al¹⁶ from Latrobe University in 2019 examined the level of aggression from drivers towards cyclists. They assessed anger towards cyclists, perceived legitimacy of cyclists as road users, and a range of other variables theoretically related to driver anger. As predicted, legitimacy was a strong predictor of driver anger specifically towards cyclists. Legitimacy, in turn, was predicted by identification with cyclists, knowledge of road rules and observations of reckless cycling. Cyclists behaving in a forceful manner (*Vehicular Cycling*) and claiming the road is often considered by drivers as illegitimate.

The most comprehensive assessment of cycling infrastructure, safety and cycling rates has recently been published in the US by Marshall and Ferenchak¹⁷. They found that cities that build protected lanes for cyclists end up with safer roads for people on bicycles, people in cars and people on foot.

Their study examined 12 large cities in the US and found cities with protected and separated bike lanes had 44 percent fewer deaths than the average city.

The study analysed 17,000 fatalities and 77,000 severe injuries in cities including Denver, Portland, Dallas, Seattle, San Francisco, Kansas City and Chicago (cities similar in structure to Australian cities) between 2000 and 2012. All of these cities experienced an increase in cycling as they built more infrastructure.

Marshall and Ferenchak assumed that having more cyclists on the street was spurring drivers to slow down. However, their results showed this wasn't the case. Instead, the study found that bicycle infrastructure, particularly physical barriers that separate bikes from speeding cars, not shared or painted lanes, significantly lowered fatalities in cities that installed them.

Importantly, the study found that **painted bike lanes provided no improvement for road safety** and that bike symbols painted in the middle of a lane (*sharrows*) — revealed that it was actually safer to

¹⁵ <https://www.monash.edu/news/articles/more-than-a-stripe-of-paint-needed-to-keep-cyclists-safe>

¹⁶ Oldmeadow, J. A., Povey, S., Povey, A., & Critchley, C. (2019). Driver anger towards cyclists in Australia: Investigating the role of the perceived legitimacy of cyclists as road users. *Transportation Research Part F: Traffic Psychology and Behaviour*, 63, 240-251.

¹⁷ Marshall, W. E., & Ferenchak, N. N. (2019). Why cities with high bicycling rates are safer for all road users. *Journal of Transport & Health*.

have no bike markings at all, i.e. painting *sharrows* is worse than doing nothing as it gives people a false sense of security that it is bike lane.

They also found not *all* protected bike lanes provide the same level of security for cyclists and drivers. In Denver, for instance, some protected lanes have plastic bollards that are interspersed along the roadway, allowing cars and trucks to park in the bike path and forcing cyclists to swerve into the street. When facilities are designed in this fashion, even if it's a protected lane, that might create a more dangerous situation because cyclists are merging in and out of the road versus places with solid barriers.

None of this is new as similar discussions have been occurring in Australia since the mid-1930s, an extended debate arose about the construction of a separated cycling facility beside Footscray Rd due to the increasing levels of injuries and fatalities of cyclists. The issue finally came to a head in 1936 where a cyclist was struck and killed by a motorist who propped his body against a post (Figure 2). The separated cycle track was built the following year.

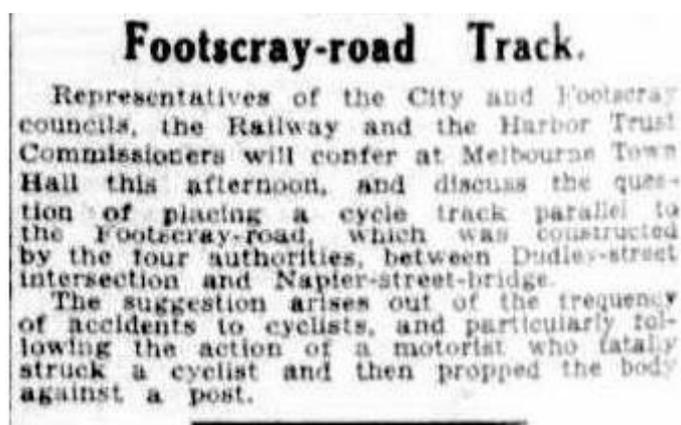
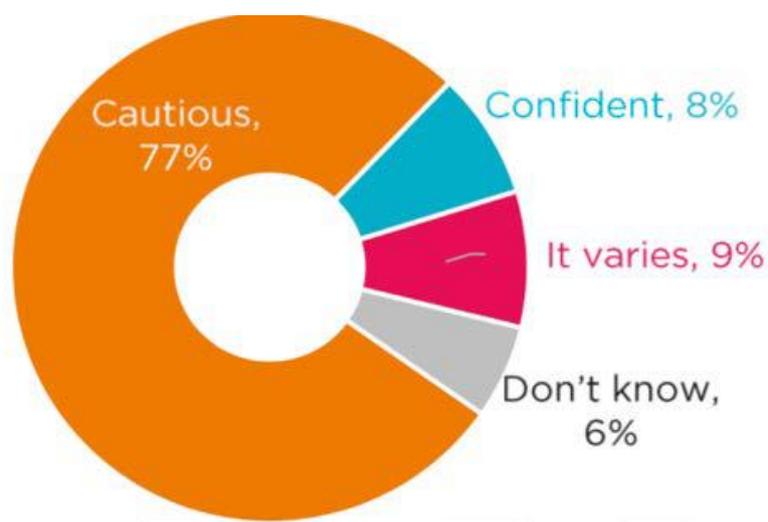


Figure 2: The Age article Wed Sep 12 1936, p12

Community Considerations

Preferred Infrastructure

The City of Melbourne's Transport Strategy commissioned research into attitudes of the community regarding cycling infrastructure¹⁸. They examined the levels of confidence in cycling ability as shown in Figure 3.



¹⁸ Philip Boyle and Associates 2018 Transport Strategy refresh Background paper Increasing the Use of Bicycles for Transport May 2018, City of Melbourne
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Figure 3: Levels of Confidence in Cycling Ability

Clearly cautious cyclists make up the vast majority of people and if physical activity and community health benefit through cycling is to increase in significant numbers then these people must be the primary focus. The research then examined how *Cautious* cyclists felt about different types of infrastructure. This are summarised in Figure 4.

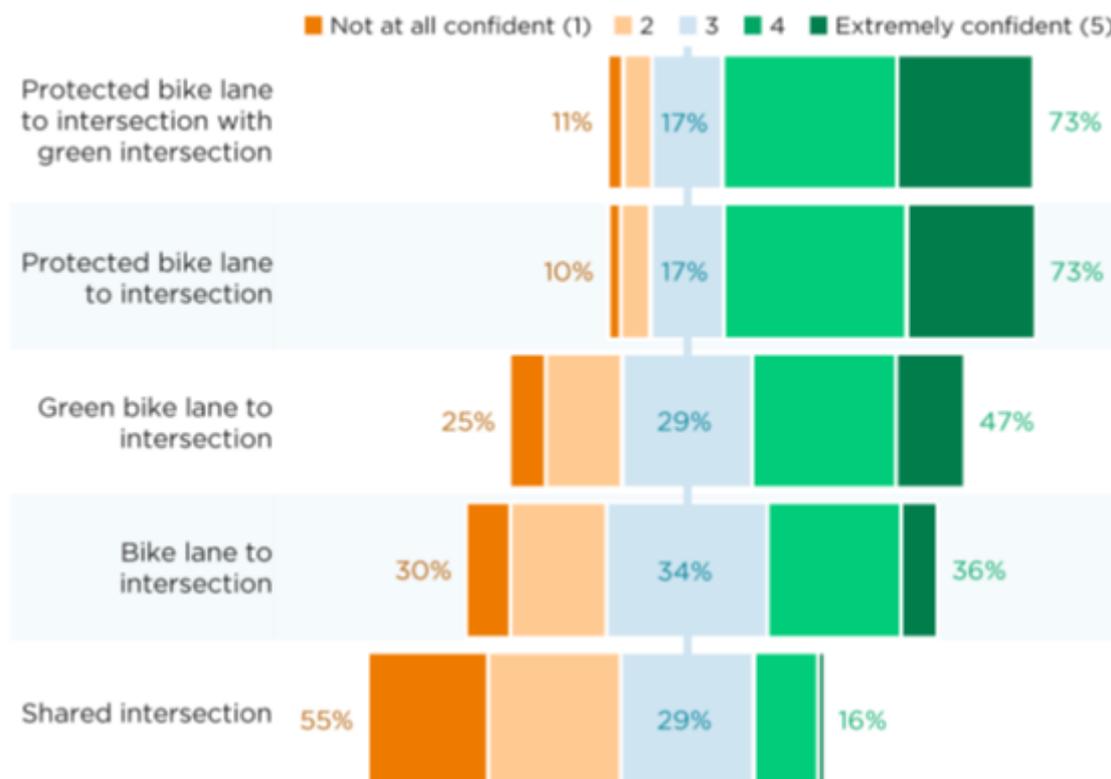


Figure 4: Rating of infrastructure Confidence by Concept

The types of infrastructure the research examined is shown in Figure 5.

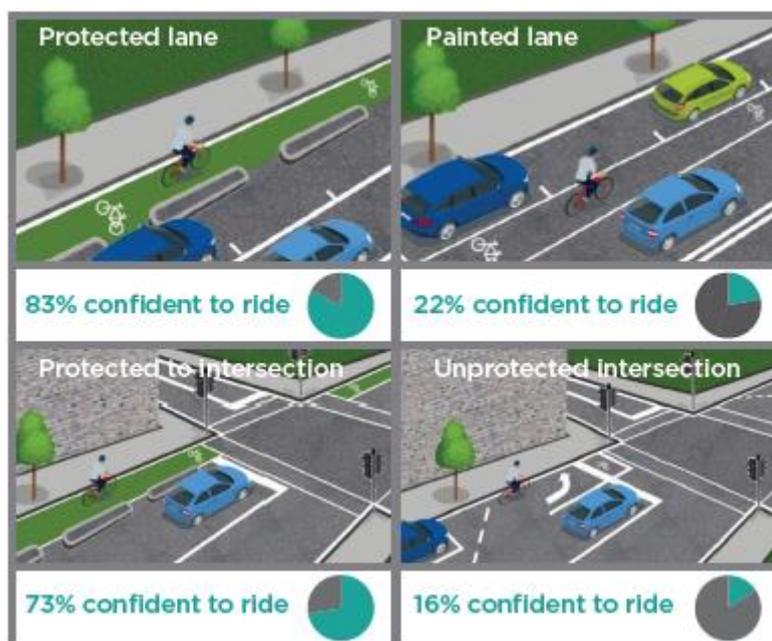


Figure 5: Bicycle infrastructure examples

Clearly the community prefers protected bike lanes and this is entirely consistent with the level of safety they provide as established by Marshall and Ferenchak’s study examining 13 years of data in 12 different cities. The message from their extensive study is: **Do it properly or don’t do it at all.**

Resistance and Acceptance

BikeWest is well aware of the fact that a small percentage of the community are openly hostile to people riding bicycles and money being spent on bicycle infrastructure. This is often accentuated when it involves removal of car parking. The strategy should include the occupancy rates of car parks, particularly on residential streets to establish the overall number of car parking in the local government area and highlight the relatively insignificant number of parking spots to be removed.

Given this is the case, the strategy should take into consideration the wide streets of the Wyndham LGA and consider infrastructure that does not remove parking but rather moves the parking to install a 1.5m bicycle lane between the footpath and parked cars where possible. Any street 12.8m or wider can accommodate a 1.5m bicycle lane, 2.1m car parking lane and a 2.8m car travel lane in both directions. This would not involve any removal of parking but increase the level of protection of cyclists enormously and is consistent with AustRoads guidelines.

An example from Copenhagen is shown in Figure 6



Figure 6: Bike lane behind car parking, Copenhagen

The Wyndham Pedestrian and Cycle Strategy should also consider how many car park spots would be removed in the context of how many car parks are available throughout the entire LGA and within the specific local context. The analysis should also include as to the percentage of road space cycling infrastructure might take up compared to the entire amount of road space as useful information to justify reallocating road space.

Various studies suggest that children are more likely to cycle if their parents do¹⁹²⁰. Basing the initial new infrastructure in areas where there is a higher likelihood of uptake and acceptance would appear to be a sensible first stage.

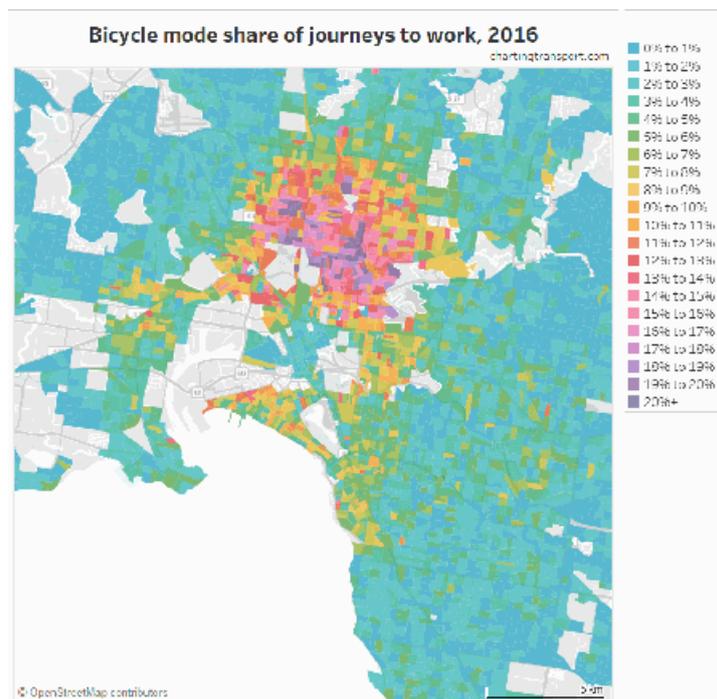


Figure 7: Bicycle mode share of journeys to work 2016

¹⁹ <https://theconversation.com/why-arent-more-kids-cycling-to-school-3531>

²⁰ Gerrard, J. 2009 Active transport: Children and young people: An overview of recent evidence December 2009, VicHealth

Opportunity Cost

The “Opportunity Cost” of anything of value is what must be given up so that something can be obtained. This is particularly pertinent for bicycle infrastructure as sometimes officials suggest lower quality infrastructure subsequently *leads* to acceptance of higher quality infrastructure amongst members of the public who do not cycle. However, there is no evidence to suggest this is the case and the *Opportunity Cost* of investing in lower quality infrastructure is forgoing higher quality infrastructure even if this is smaller in quantity.

Benefit Cost Ratio

A benefit-cost ratio (BCR) is an indicator, used in cost-benefit analysis, that attempts to summarise the overall value for money of a project or proposal. A BCR is the ratio of the benefits of a project or proposal, expressed in monetary terms, relative to its costs, also expressed in monetary terms. In Australia, with cycling infrastructure there are many benefits that are not monetised, for instance health, environmental, amenity benefits, therefore making calculating BCR’s difficult. Despite this, there are many examples of attempts to monetise benefits including by the *World Health Organisations* Health Economic Assessment Tool (HEAT)²¹ or Gössling’s Transport Transitions in Copenhagen²².

Opportunities

Many opportunities exist to install high quality bicycle infrastructure with minimal disruption to the community and these opportunities should be taken into consideration

Destinations

BikeWest feels strongly the focus on infrastructure should be to enable replacing short car trips to local destinations with bicycle use. These destinations include Schools, Stations and Shops (SSS). According to the latest Victorian Integrated Survey of Travel and Activity (VISTA), half of all trips in Melbourne are less than 4.3km which is an ideal cycling distance.

Draft Wyndham Pedestrian and Cycle Strategy Proposals and Response

The Strategy is divided into 3 sections: Network, Infrastructure and Education, Promotion and Communication. In principle, BikeWest supports this focus.

Network

“Objective 1: Achieve and integrated pedestrian and cycle network that will enable all users to move around the network according to their needs”

Bike supports this objective, however, specific Action Items require revision

Action Number 1.1 Conduct an initial audit of the pedestrian and cycle path network to identify missing links and infrastructure issues.

As Marshall and Ferenchek state, it is not only the infrastructure but the quality of the infrastructure that is important. More painted lines on roads will not get more people leaving their cars at home and jumping on their bicycles. This is related to the density of the network. As stated in Queensland’s Department of Main Roads Technical Note 128: Selection and Design of Cycle Tracks (2015):

The cycle network should include an appropriate density of well-connected cycle routes linking all origins to all destinations, including public transport stations, without interruption. Cycle routes that suddenly stop are a major disincentive for cycling and may force bicycle riders into a dangerous situation. Bicycle riders should always be confident that there will be a quality cycling route to all

²¹ <https://www.heatwalkingcycling.org/>

²² Gössling, S., & Choi, A. S. (2015). Transport transitions in Copenhagen: Comparing the cost of cars and bicycles. *Ecological Economics*, 113, 106-113.

destinations. Low density development and poorly connected streets reduce the coherence on the cycle network

Action Number 1.2: Develop Wyndham pedestrian and cycle network plans

This is a must. Without proper planning the development of cycle infrastructure will be ad hoc and result in a poor outcome with no coherence.

As this Action Number states, the network should include access to local destinations including public transport. There is an increasing focus on combining cycling with public transport in order to obtain the benefits of both.

BikeWest has undertaken preliminary analysis to determine the number of residents who live within 2.5km of a train station. This represents a 10 min cycle travelling at the gentle pace of 15km/h. An analysis of Statistical Area 1s in the Wyndham LGA is shown Figure 8

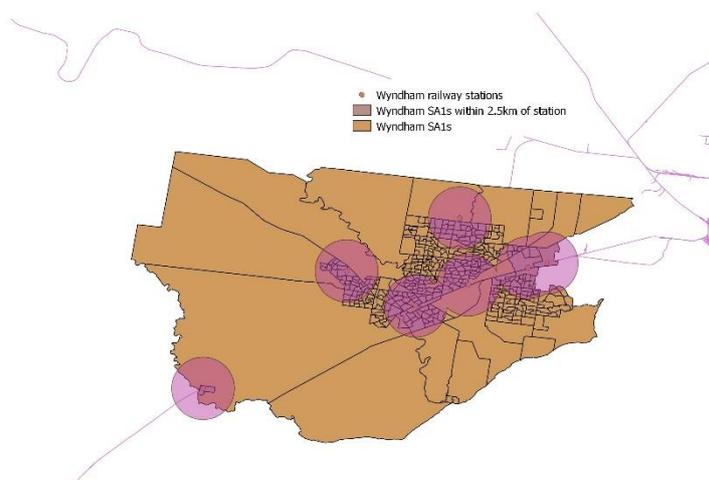


Figure 8: SA1s within 2.5km of train stations in Wyndham LGA

The latest census results (2016) show this includes approximately 100,000 people, or 45% of the residents of Wyndham. Such analysis shows the enormous potential of combined cycling and public transport.

This Action Number mentions Strategic Cycling Corridors, however, given this concept has been in existence for over 20 years with no progress made BikeWest considers this initiative to be of little relevance to cycling infrastructure. The bulk of roads are owned by council and it is on these roads that the network should most heavily rely.

Action Number 1.3: Utilise the Movement and Place Framework to Assess activity intense areas to improve interactions between pedestrians, cyclists and other transport modes. While elements of the Movement and Place Framework are useful, the language of this Action Number indicates a lack of understanding of the needs of cycling infrastructure. According to the Safe System Approach, cycling infrastructure should attempt to minimise the interactions between different modes, not simply improve them. The Movement and Place Framework also discusses Level of Stress as a form of assessment of cycling infrastructure. This is an antiquated approach. According to Austroads Research Report: Best Practice²³ in Road Safety Infrastructure Programs²³, where speeds of motor vehicles are above 30km/h cyclists must **always** be separated from motor vehicle traffic (p5) due to the incompatibility of speeds and masses.

²³ Austroads 2018 Best Practice in Road Safety Infrastructure Programs Research Report AP-R562-18

Action Number 1.4: Prepare an Implementation Plan for Infrastructure Improvements in the pedestrian and cycle network

BikeWest supports the preparation of an implementation plan in order to methodically plan improvements. This must include works that are not specifically identified as cycling infrastructure such as Local Area Traffic Management Plans and road re-sheeting. Given the 10s of millions of dollars Wyndham currently spends on roads, some of these projects should incorporate cycling infrastructure into their design.

Action Number 1.5: Support and Advocate for a safer and accessible pedestrian and cycle network.

Inclusion of the Crime Prevention through Environmental Design and Safety by Design approaches are supported by BikeWest as well as catering for people with disabilities

Infrastructure

Objective 2: Pedestrian and cycle transport infrastructure meets the needs of all people within Wyndham.

BikeWest supports this objective.

Action Number 2.1: Review internal documents, standards and guidelines to identify opportunities to improve infrastructure across the pedestrian and cycle network

Review of all internal documents should be encouraged, however, the current standards suggested by VicRoads are inconsistent with world's best practice or even Queensland's Department of Main Roads²⁴, including the latest Austroads publication regarding Best Practice in Road Safety Infrastructure Programs²⁵. Unfortunately this has led councils in Victoria to install substandard infrastructure as they follow VicRoads guidelines. Every effort should be made to utilise the most up to date guidance including that provided by the National Association of City Transport Officials (NACTO) in the USA. NACTO provide extensive documents on the most up to date practices.

Action Number 2.2: Ensure that Council projects incorporate improvements to pedestrian and cycle infrastructure

This would appear to be the main purpose of the Cycle and Pedestrian Strategy.

Action Number 2.3: Investigate opportunities for pedestrian and cycle innovations within Wyndham.

Innovative approaches are required to incorporate cycling infrastructure into the City of Wyndham. Members of BikeWest have undertaken study tours of innovative cycling solutions in Bristol, UK, Edinburgh, UK, Seville, Spain and Gothenburg, Sweden. Traditional approaches to road design in Australia often limit the ability to install high quality infrastructure due to the conservative approach undertaken by most traffic engineers which prioritises high speed vehicular flow. This approach is contrary to the Safe System approach and therefore when investigating opportunities for cycling infrastructure it is vital that professionals from other disciplines are involved as well as extensive community engagement along the lines adopted by Complete Streets with their Place Score Approach. This innovative approach often highlights the discrepancy between what council perceives as priorities for its residents to what residents actually desire. An excellent case study is the City of Coffs Harbour²⁶. The experience in Coffs Harbour showed that 26.2% of residents prioritised improvements to active transport infrastructure compared to 10.8% for improved private vehicle infrastructure. Whereas the expenditure by council was weighted by a factor of 100 in favour of private vehicle infrastructure. Without a comprehensive and rigorous analysis of community

²⁴ Queensland Department of Main Roads 2015 Technical Note 128 Selection and Design of Cycle Tracks, May

²⁵ Austroads 2018 Best Practice in Road Safety Infrastructure Programs Research Report AP-R562-18

²⁶ <https://www.coffsharbour.nsw.gov.au/Building-and-Planning/Place-Strategies/Pages/PlaceScore.aspx>

views, councils will continue to assume more roads for cars are what the community wishes when in the experience of the Complete Streets consultants, this is nearly never the case.

Action Number 2.4: Investigate the development of a local policy and advocate for a planning scheme amendment to better cater for cycle infrastructure within new developments
Incorporating high quality cycling infrastructure into the design of new developments before they are constructed is always preferable to retrofitting due to the difficulties in retrofitting and resistance to change from residents.

Action Number 2.5: Identify the amenity requirements to support increased participation in active travel

The issue of amenity can be categorised in terms of cycling infrastructure and end of trip facilities. Amenity of a cycling infrastructure relates to both perceived safety and quality of infrastructure. The surroundings encountered when cycling range from attractive to intimidating and can encourage or discourage cycling along a route. Landscaping and surroundings can make a cycling route very attractive through an area that might have otherwise been avoided, while high fences, lack of casual surveillance and no lighting at night can result in actual and perceived loss of personal security.

Where there is no bicycle infrastructure, it is a major barrier for attracting bicycle riders²⁷. Bicycle infrastructure that is physically separated from motorised vehicles, direct and attractive is perceived to be safer and will generally attract all types of bicycle riders²⁸.

End of Trip facilities include bike parking and showers and change rooms. Cycle parking ranges from fully automated systems in Japan and vast underground bike storage in Utrecht to simple hoops to lock your bike. The importance of bicycle parking is often overlooked by local authorities as it is a major disincentive for people to ride if they are unsure whether they will be able to have a secure place to lock their bicycle.

Showers and changing rooms are of less significance but can be incorporated into planning requirements for new buildings and incentives offered to employers to provide them thus giving more encouragement for their employees to cycle.

Action Number 2.6: Investigate opportunities for paths to acknowledge local Aboriginal culture and history

BikeWest strongly supports this Action Number.

Education, Promotion and Communication

Objective 3: Wyndham residents have access to information on smarter, healthier, more environmentally sustainable travel choices through education, promotion and communication

Action Number 3.1: Review the Active Travel to School program to identify what is working well and the barriers to engagement.

Education is key as identified by Pucher and Buehler and included in the City of Sydney Cycle Strategy. At a minimum every child in the Wyndham LGA should undertake bicycle riding lessons as currently 1 in 3 young people in Australia do not know how to ride a bicycle²⁹. The Wyndham

²⁷ Robinson D, 2005, Safety in numbers in Australia: more walkers and bicyclists, safer walking and bicycling. Health Promotional Journal of Australia 2005

²⁸ Bauman et al., 2008, Cycling: getting Australia moving – barriers, facilitators and interventions to get more Australians physically active through cycling

²⁹ Crawford, S., Bennetts, S. K., Cooklin, A. R., Hackworth, N., Nicholson, J. M., D'Esposito, F., Green, J., Matthews, J., Zubrick, S. R., Strazdins, L. & Parcel, G. 2015. Parental fear as a barrier to children's independent mobility and resultant physical activity. Final Report. Melbourne: La Trobe University
BikeWest submission: Wyndham Pedestrian and Cycle Strategy

Pedestrian and Cycle Strategy should include elements to actively support people new to cycling and those who are wary of getting back on their bikes.

Data published by Active Healthy Kids Australia (Figure 9) shows the significant decline in the percentage of children who use active transport to and/ or from school since 1970 across a number of countries.

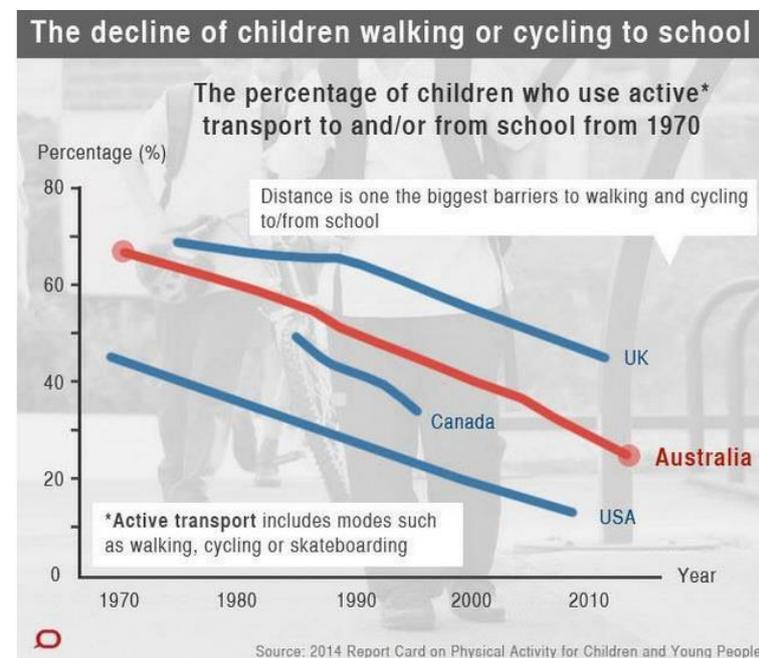


Figure 9: Rates of Active Transport to School

Data released on 22nd January, 2018 by [LiveLighter](#) public health campaign, run by the Heart Foundation and Cancer Council Victoria shows that in Australia, 64% of children travel to school by car (Figure 10).



Figure 10: Percentage of Children Driven to School

Data published by VicRoads (Figure 11) shows significant reduction in traffic volumes during school holidays.

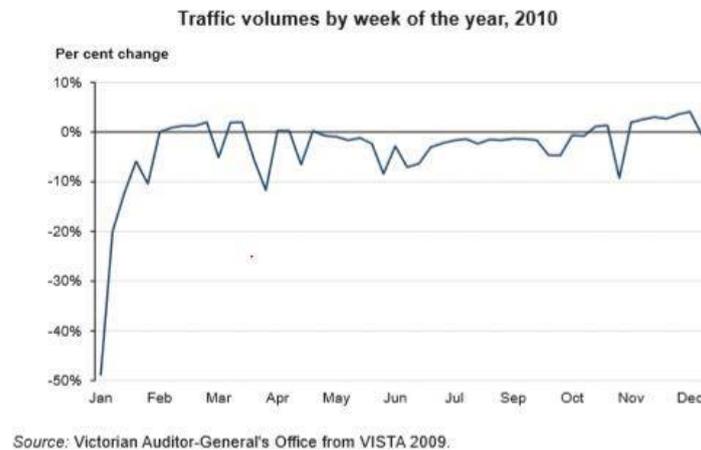


Figure 11: Weekly Traffic Volumes

The 2013 Victorian Auditor-General's Report on Managing Traffic Congestion identifies car trips to school as a significant contributor to road congestion and suggests demand management (Pgs 23, 24 & 57):

“The use of cars to drive children to school has risen steeply over the past three decades, contributing to widely dispersed areas of localised congestion. It further notes there is the opportunity for travel demand management measures to encourage mode shift for school journeys.

Figure 11 highlights the changes in traffic volumes across the 12 months of 2010, and shows the significant decline in volumes during school holiday periods. This suggests that changes in road use behaviour for school commuting have the potential to reduce current traffic volumes by around 5 to 10 per cent. This could lead to substantial improvements in road network performance and accessibility.”

There are many academic studies on Active Travel to School with the main conclusion relating to safety of the journey to school³⁰. Some studies suggest over half of all students would cycle if it were safe to do so³¹. The nature of the urban structure can affect children's mode of transportation to school³². Children are more likely to cycle regularly if they had access to bike paths³³.

Research undertaken by Sustrans³⁴ in the UK which examined school based travel interventions including education programs, school travel plans, Bikeability lessons, rural/urban classification, socio-economic status, proximity to green space and proximity to protected bike lanes. The most significant correlation between rates of cycling were with proximity to green space but most of all proximity to protected bike lanes.

The importance of getting children to cycle to school cannot be overstated. The Australian Health Policy Collaboration produced a report in 2018 titled Active Travel: Pathways to a Health Future. This report established

³⁰ Mandic, S., Hopkins, D., Bengoechea, E. G., Flaherty, C., Williams, J., Sloane, L., ... & Spence, J. C. (2017). Adolescents' perceptions of cycling versus walking to school: Understanding the New Zealand context. *Journal of Transport & Health*, 4, 294-304.

³¹ Larouche, R., Stone, M., Buliung, R. N., & Faulkner, G. (2016). “I’d rather bike to school!”: Profiling children who would prefer to cycle to school. *Journal of Transport & Health*, 3(3), 377-385.

³² Broberg, A., & Sarjala, S. (2015). School travel mode choice and the characteristics of the urban built environment: the case of Helsinki, Finland. *Transport policy*, 37, 1-10.

³³ Carver, A., Timperio, A. F., & Crawford, D. A. (2015). Bicycles gathering dust rather than raising dust—Prevalence and predictors of cycling among Australian schoolchildren. *Journal of science and medicine in sport*, 18(5), 540-544.

³⁴ Hogg, F (2015) Active Travel to School: The Effectiveness of School Based Travel Interventions
BikeWest submission: Wyndham Pedestrian and Cycle Strategy

- over 70% of children and 91.5% of young people do not meet physical activity recommendations³⁵.
- Declining rates of physical activity are contributing to accelerating rates of childhood overweight and obesity. Over one-quarter of Australian children are overweight or obese³⁶.
- 9.7% of school children have been measured as vulnerable in their physical health and wellbeing domain in the Australian Early development Census, a three yearly survey of children entering their first year of school³⁷.
- Regular physical activity is recognised as improving academic performance³⁸³⁹.

Active travel is one of the easiest ways to incorporate physical activity into everyday life and should be the main priority for education and health strategies for children in the City of Wyndham.

Action Number 3.2: Develop guidelines for the use and design of a standard suite of directional signs for paths and trails in Wyndham.

Consistent and clear Directional signage is important for the success of a bicycle network and BikeWest supports this Action Number.

Action Number 3.3: Develop online maps and information materials to communicate active travel options in and around Wyndham.

While development of online information is helpful it is not key to the success of a bicycle network consequently this should be a lower priority compared to high quality infrastructure and working with schools to increase rates of active travel.

Overall Elements

Overall, BikeWest considers the strategy must emphasise the first element of Pucher and Buehler's "Making Cycling Irresistible" of creating a comprehensive network of protected bicycle routes. However, this is only the first step of 7 to get people to use their bicycles as a form of everyday transport. The approach outlined in the *Draft Wyndham Pedestrian and Cycle Strategy* contrasts with that of the City of Melbourne and the City of Sydney which provide a good reference point.

City of Sydney Cycling Strategy and Action Plan

The City of Sydney Cycling Strategy and Action Plan identifies and quantifies population growth and associated car travel if the current mode split continues. It also identifies the number of short trips undertaken by car that could easily be replaced by bicycles. The actions prioritise connecting the network as per the first step identified by Pucher and Buehler. They identify bike parking as a key issue. They will provide shared paths on, and alternative routes for, state roads where the City is not currently permitted to reallocate road space. They will advocate to the NSW Government for lower speed limits, including 30km/h which is the recommended speed according to the Safe System approach.

City of Sydney also identify actions to support people to ride, which is noticeably absent in the part of the Wyndham Pedestrian and Cycle Strategy. This is another key element identified by Pucher and Buehler. They intend to focus on areas of where existing and new infrastructure is connected. They

³⁵ Lindberg, R., et al., *Getting Australia's Health on Track 2016*. 2016, Australian Health Policy Collaboration, Victoria University: Melbourne

³⁶ Tolhurst, P., et al., *Australia's Health Tracker*. 2016, The Australian Health Policy Collaboration, Victoria University: Melbourne

³⁷ Australian Early Development Census. *Emerging Trends*. 2014; Available from: <https://www.aedc.gov.au/early-childhood/findings-from-the-aedc>

³⁸ Howie, E.K. and Pate, R.R., Physical activity and academic achievement in children: A historical perspective. *Journal of Sport and Health Science*, 2012. 1(3): p. 160-169

³⁹ Duncan, M., & Johnson, A. (2014). The effect of differing intensities of acute cycling on preadolescent academic achievement. *European journal of sport science*, 14(3), 279-286.

intend to support children and families to ride safely and increase cycling participation, especially by women (Figure 12).



Figure 12: City of Sydney Existing and Proposed Protected Bicycle Network

The City of Sydney Cycling Strategy and Plan also plans to support business who sometimes react in a hostile fashion, as they imagine increasing cycling rates will decrease business turnover despite a large body of literature to the contrary. The City of Sydney plans to enlist the support of business to increase cycling and deliver end of trip facilities and support for business.

The City of Sydney plans to provide leadership and advocacy by leading by example in encouraging staff to cycle to work and for work trips as well as integrate cycling into work operations. They also will push for integration of cycling and public transport which is a key opportunity.

City of Melbourne Transport Plan

The City of Melbourne adopts an integrated transport mode approach but adopts key the message of A Safe and Liveable City, An Efficient and Productive City and a Dynamic and Adaptive City.

The City of Melbourne also identifies population growth as a key factor to influence their transport strategy. The City of Melbourne state bikes must play a more significant role in the transport network. The huge potential for more trips to be made by bike is possible with the right infrastructure. Once safe, connected bicycle lanes are in place, more trips will be made by bike. Bike trips are low-cost for the user and government; they improve the efficiency of the transport network and benefit society more broadly.

This contrasts with the *Wyndham Pedestrian and Cycle Bicycle Strategy* which adopts and almost apologetic approach towards reallocating road space to bicycle infrastructure as opposed to identifying it as a key priority for the success of the city.

The Safe and Liveable City Theme leads to a 'safe streets for biking' outcome. This means people in Melbourne will feel confident to ride a bike. Major investment in safer cycling infrastructure and programs will make cycling a vital and growing component of the transport network. Transport corridors with protected bike lanes will move more people in a cost effective way using the same amount of space, increasing safety and contributing less noise and air pollution

An efficient and productive city leads to more people riding bikes and increased bicycle use will support a healthy, sustainable and prosperous community. Cycling will ease pressure on our public transport network - particularly on crowded inner-city trams – and decrease traffic congestion. Increased bicycle use will be supported by an uptake in electric pedal-assist bikes, more programs to boost people's riding skill and confidence and possible improvements to road rules to reduce barriers to riding.

A dynamic and adaptive city leads to more flexible mobility, reduced parking demand and greatly reduced road trauma. Potential negative impacts, including increased congestion and reduced active travel, will be avoided. This theme also leads to zero emissions transport with a goal by 2050, transport in the municipality will be emissions-free. Walking, cycling and public transport will increase.

The City of Melbourne Transport Strategy draws upon evidence to support its various plans including the goal to reduce speeds to 30km/h. They quote evidence from cities around the world are adopting 30 km/h (or 20 mi/h) speed limits in busy areas. A person in a collision with a motor vehicle has a 90% chance of survival when struck at 30 km/h compared with a less than 50% chance of surviving an impact at 45 km/h. At 80 km/h there is almost no chance of survival.

Speed limits in the central city were reduced from 50 km/h to 40 km/h in 2012. In the following five years collisions declined by 36.5 per cent while the daily population (residents, workers, students and visitors) increased by 9 per cent. This equates to 170 people avoiding sustaining serious, lifelong and debilitating injuries

The protected bicycle lanes include 50km of high quality, physically protected bicycle lanes over 10 years to get more people riding each day. The City of Melbourne plan to work with the Victorian Government to enable a further 40km of high quality, physically protected bicycle lanes on key state managed roads over 10 years (Figure 13).

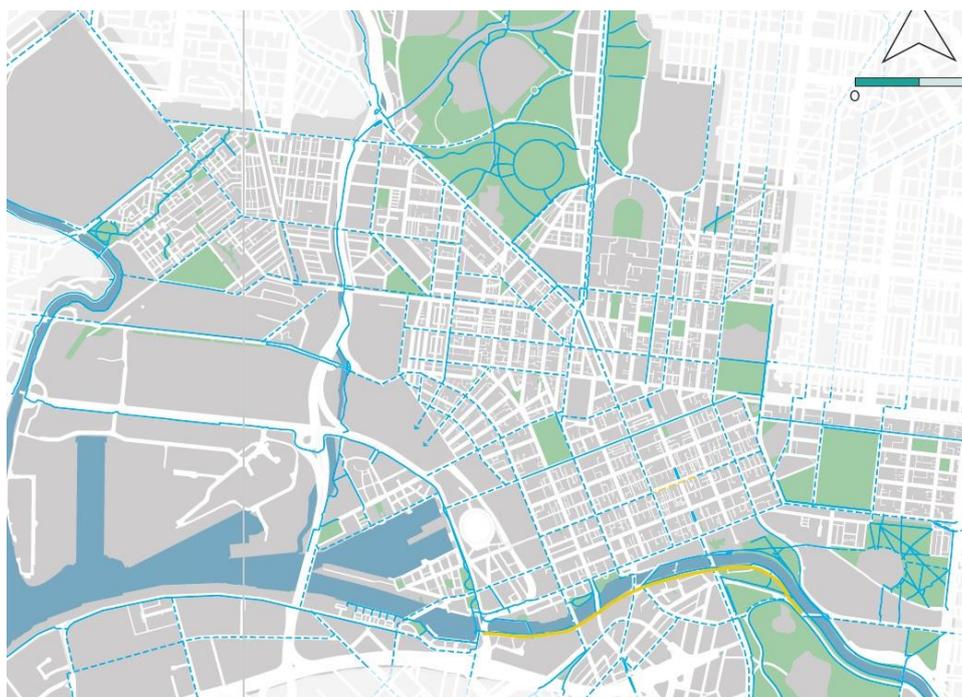


Figure 13: City of Melbourne Proposed Protected Bicycle Lane Network
BikeWest submission: Wyndham Pedestrian and Cycle Strategy

A fully integrated bicycle network is key element to the Wyndham Pedestrian and Cycle Bicycle Strategy and is a major factor in getting people to use bicycles as a form of transport. As stated by Baumann⁴⁰ the cycle network should include an appropriate density of well-connected cycle routes linking all origins to all destinations, including public transport stations, without interruption. Cycle routes that suddenly stop are a major disincentive for cycling and may force bicycle riders into a dangerous situation. Bicycle riders should always be confident that there will be a quality cycling route to all destinations. Low density development and poorly connected streets reduce the coherence on the cycle network

Recreation and Sport

The bike strategy should include strategies and programs to increase the amount of recreational cycling as well as cycling for transport. The recent development of the Lawrie Emmins Reserve Strategy goes a long way towards achieving this goal when it is eventually built, however, more can be achieved in the meantime.

BikeWest has already begun work to establish MTB programs at both Footscray City College and Maribyrnong College based on a subject developed at Dromana Secondary College. BikeWest is keen to establish similar programs in the City of Wyndham.

BikeWest has supported the formation of a new cycling club, Westside Cycle Club which will have a particular focus on young people due to the absence of any cycling club for young people between Brunswick and Geelong since 1991 with the closure of the Footscray Amateur Cycling Club. Westside Cycle Club are proposing holding criterium and Cyclocross (CX) races and social rides at various venues around the west of Melbourne including Wyndham. Wyndham Council should support Westside Cycle Club's initiatives to increase the number of people participating in both competitive and social cycling.

Conclusion

BikeWest has drawn upon an extensive body of evidence to analyse the Wyndham Pedestrian and Cycle Strategy. This analysis has shown that while there are substantial sections of the *Strategy* that BikeWest supports, there are significant issues regarding details that should be addressed. A comprehensive and methodical approach to a bicycle network is to be commended and is consistent with the substantial body of evidence showing what such measures are the starting point.

⁴⁰ Bauman et al., 2008, Cycling: getting Australia moving – barriers, facilitators and interventions to get more Australians physically active through cycling
BikeWest submission: Wyndham Pedestrian and Cycle Strategy

Appendix 1: Heaven and Hell Scenarios

	Heaven			Hell		
POLICIES	<ul style="list-style-type: none"> ➤ Road pricing and restriction of private car usage. ➤ Continued investment in public transport. ➤ Reallocation of street space towards active modes and public space. ➤ High density walkable growth. ➤ Mobility data sharing requirements. ➤ Engagement and partnership with private sector mobility companies. 			<ul style="list-style-type: none"> ➤ Failure to implement effective road pricing to prevent huge increase in vehicular travel. ➤ Street design determined by the need to accommodate technology rather than human and public space considerations. ➤ Land use planning fails to control sprawl induced by new transportation technologies. ➤ Public transport does not receive enough investment and loses competitiveness in favour of new private mobility services. ➤ Failure to implement effective data sharing requirements. ➤ New mobility technologies compete with public transport, rather than complementing it as last mile solutions. 		
OUTCOMES	 <p>CARS</p> <p>Private car ownership ends and is replaced by shared, electric, autonomous, higher occupancy vehicles which support the public transport network as last-mile connectors.</p>	 <p>STREET DESIGN</p> <p>Streets are designed to be flexible, pedestrian-oriented, and to prioritise active travel. Signage, kerbs, parking meters and other clutter is removed as obsolete for CAVs.</p>	 <p>PUBLIC SPACE</p> <p>Underused parking is reclaimed as public space, and diverse uses are included—from playground to space of trade and commerce.</p>	 <p>CARS</p> <p>Private ownership of cars continues creating zero occupancy 'zombie car' trips. Traffic on the road is increased due to convenient pricing as oppose to other active travel options.</p>	 <p>STREET DESIGN</p> <p>Streets are filled with clutter to support CAVs, including electric charging points and barriers that reduce access to pedestrians. New lanes are built to accommodate increased traffic.</p>	 <p>PUBLIC SPACE</p> <p>The street loses its function as public space and it is used entirely for movement.</p>
	 <p>ACTIVE TRAVEL</p> <p>Cycling is normalised as a mode of transport for short to medium distance journeys, with eBikes used for longer distances. Dockless bikes are integrated into the public transport network.</p>	 <p>PUBLIC TRANSPORT</p> <p>Public transport remains the central form of transportation in London and integrates all forms of last-mile mobility on a 'Mobility as a Service' platform.</p>	 <p>DENSITY</p> <p>Density is increased next to public transport nodes, and new housing developments include access to a broad range of mobility options to reduce car ownership among new residents.</p>	 <p>ACTIVE TRAVEL</p> <p>Walking and cycling decline due to a lack of improvement in active travel infrastructure as well as the low cost of CAVs, which in turn become more convenient even for short journeys.</p>	 <p>PUBLIC TRANSPORT</p> <p>Public transport is cut in lower density areas due to competition of ride hailing services. Mobility as a Service platforms fail to integrate with public transport.</p>	 <p>DENSITY</p> <p>Increased CAV technologies in low density, out of town areas leads to urban sprawl.</p>
	 <p>ACCESSIBILITY</p> <p>Street design is improved to reduce clutter and increase step free access. Access to new on-demand accessible transport services supplements the public transport network.</p>	 <p>DATA ACCESS</p> <p>All new mobility services are required to share data on usage with Transport for London for regulation.</p>	 <p>FREIGHT & THE HIGH STREET</p> <p>Freights are consolidated and smaller last-mile delivery vehicles, including cargo bikes and automated small vehicles are used. The high street reinvents itself with community focused functions.</p>	 <p>ACCESSIBILITY</p> <p>The street becomes an increasingly difficult space for disabled people due to new pedestrian barriers and restrictions.</p>	 <p>DATA ACCESS</p> <p>A lack of data sharing requirement for new mobility operators means it becomes difficult to track the impact of new mobility services and to effectively regulate them.</p>	 <p>FREIGHT & THE HIGH STREET</p> <p>Lack of consolidation of deliveries leads to large numbers of vehicles making multiple trips to the same destinations. The high street fails to adapt to changing consumer behaviour.</p>
SUMMARY	<ul style="list-style-type: none"> ➤ A strengthened public transport network, supplemented by new last-mile connections integrated via a MaaS platform. ➤ A greater mix of accessible mobility options to allow people to choose the mode of transport appropriate for each journey, reducing in turn car-dependence. ➤ New radical human centric street designs enabled by greater external control of cars and CAVs. ➤ A continued focus on enabling active transport through investment in safe cycling and walking infrastructure. ➤ Renewed high streets supported by a reconceptualisation of streets as public spaces. ➤ An efficient and appropriate system of urban freight movement in central London. 			<ul style="list-style-type: none"> ➤ Failure to implement effective road pricing mechanism leads to a further increase in the number of cars on the road and miles travelled in vehicles. ➤ Public transport services are undercut and undermined by private autonomous ride hail services. ➤ Increased social isolation and inactivity resultant from a shift towards autonomous private cars. ➤ Conceptions of the street as public space are lost entirely and access to the street is restricted for pedestrians and cyclists. ➤ London sprawls with low density autonomous vehicle oriented commercial and residential development in Outer London. ➤ Increase in negative public health outcomes resultant from increased inactivity. 		